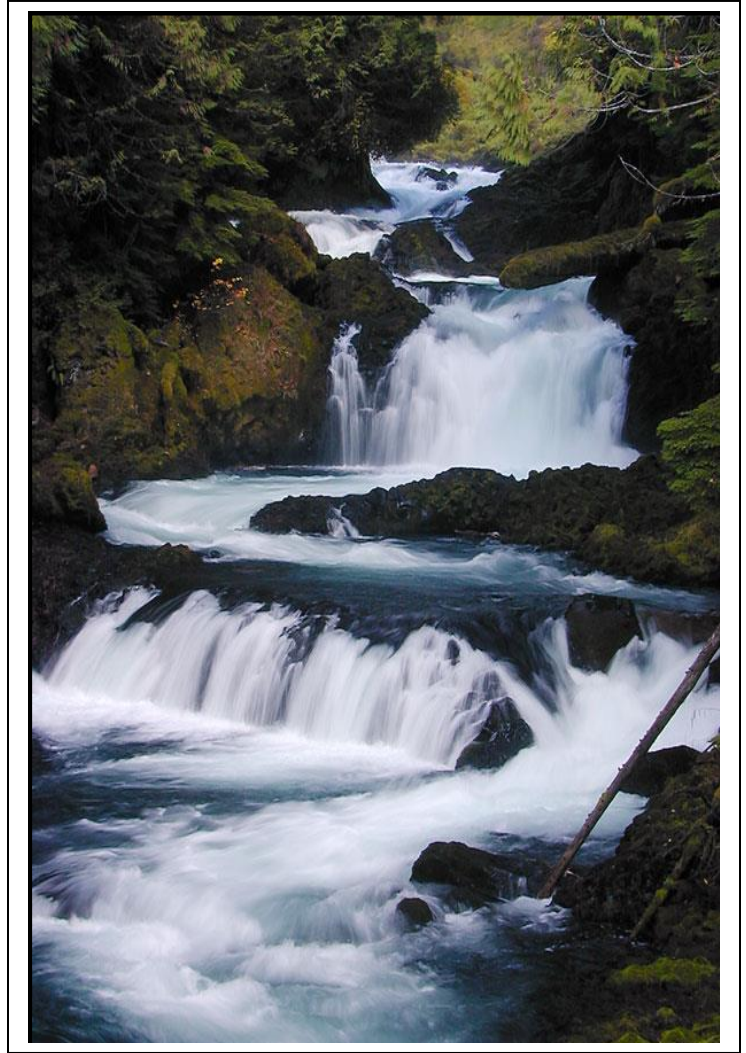


Mount Hood  
National Forest  
Water Quality  
Best Management  
Practices (BMP)  
Monitoring Report  
Fiscal Year 2013



Prepared by: [Todd Reinwald, Soil and Water Program Manager, Mt. Hood NF HQ](#)  
Contributors: [Barlow, Clackamas River, Hood River, and Zigzag Ranger Districts](#)

## Table of Contents

<b>1. Introduction .....</b>	<b>2</b>
<b>2. Background.....</b>	<b>2</b>
<b>3. Objectives .....</b>	<b>4</b>
<b>4. Methods .....</b>	<b>4</b>
<b>5. Results and Discussion.....</b>	<b>7</b>
5.1. Summary of Results .....	8
<b>6. Recommendations.....</b>	<b>11</b>
6.1. Specific Remedies .....	12
<b>7. References .....</b>	<b>13</b>
<b>8. Appendix A: List of Core BMPs Monitored on the Mt. Hood NF in 2013 .....</b>	<b>14</b>

## 1. Introduction

This report documents water quality Best Management Practices (BMP) monitoring conducted on the Mt. Hood National Forest (MHNH) in fiscal year 2013. This is the first annual report of BMP monitoring on the MHNH under the newly established Forest Service (FS) National BMP Program. The report is intended to: 1) document and share results of BMP implementation and effectiveness monitoring with internal and external partners; 2) provide feedback to MHNH leadership and project teams about what is working well and what might need to be done differently in the future 3) to provide a basis for tracking BMP performance over time; and 4) to report the results as per monitoring requirements of the Mt. Hood Land and Resource Management Plan (Forest Plan).

**Water Quality Best Management Practices (BMPs)** are methods, measures, or practices to control nonpoint source pollution. BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during, and after activities in an effort to reduce or eliminate the introduction of pollutants that could potentially be transported into receiving waters (36 CFR 219.19).

Implementation and monitoring of BMPs is the fundamental means by which the FS protects, restores, and/or mitigates water quality impacts from activities on National Forest System (NFS) lands. Monitoring of BMPs is an integral component of the FS National BMP Program because it is necessary to evaluate whether BMPs are being implemented as prescribed, whether the BMPs are effective in protecting water quality, and whether actions are needed to improve BMP implementation or effectiveness. Monitoring is intended to answer several key questions: 1) “Did we do what we said we would do to protect water quality?” and 2) “How well did it work?” Monitoring results are examined in spatial context, among sites on which BMPs were applied, and across project types to identify strengths and weaknesses in the FS water quality management program.

Monitoring results in this report cover a mix of activities that occurred in 2013 (active projects), as well as several others projects that were implemented in previous years (completed projects). Monitoring was conducted by MHNH staff in program areas including: Contract Administration, Engineering, Fire Management, Fisheries, Wildlife, Forestry, Hydrology, Recreation, and Soil science. This report provides a summary of the projects monitored, the BMPs employed on them, and the findings of the evaluation.

## 2. Background

The Federal Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.) is the foundation for surface water quality protection in the United States. The objective of the CWA is to maintain and restore the chemical, physical, and biological integrity of the Nation’s waters. The law uses a variety of regulatory and non-regulatory tools to address direct pollutant discharges from point sources and manage polluted runoff from nonpoint sources to waters of the United States.

Protections of surface water quality as decreed by the CWA were incorporated as standards and guidelines into the Mt. Hood Land and Resource Management Plan of 1990, as amended by the

Northwest Forest Plan of 1994. In both, monitoring of the implementation and effectiveness of BMPs is directed, and includes a reporting element to identify any adjustments or adaptive management that may be needed. The reporting also serves to disclose the findings of monitoring activities to the public.

Under the CWA, Congress gave States and Tribes the option for taking primary responsibility for water pollution control. Oregon and Washington have done that and each State has a Nonpoint Source Management Program and Plan that directs how the State will control nonpoint source pollution. As an agency of the federal government, the FS is required to comply with all Federal, State, and local requirements for water pollution control in the same manner and to the same extent as any nongovernmental entity (CWA section 313).

In the Pacific Northwest Region of the Forest Service, water quality agreements with the States of Oregon (OR-DEQ and FS, 2013) and Washington (FS and WA-DOE, 2000) have been prepared that outline how the FS will implement the State's Nonpoint Source Management Plan on NFS lands. Through those agreements, the agencies have agreed that BMPs are a key means of protecting water quality and meeting water quality standards.

The FS strategy for control of nonpoint source pollution is to apply BMPs using adaptive management principles (Figure 1). This involves the application of appropriate BMPs, monitoring their implementation and effectiveness, and using the monitoring results to inform and improve ongoing or future management activities. It is anticipated and expected, that through this iterative process of monitoring and adjusting BMPs, water quality standards can be achieved and maintained (EPA 1987).

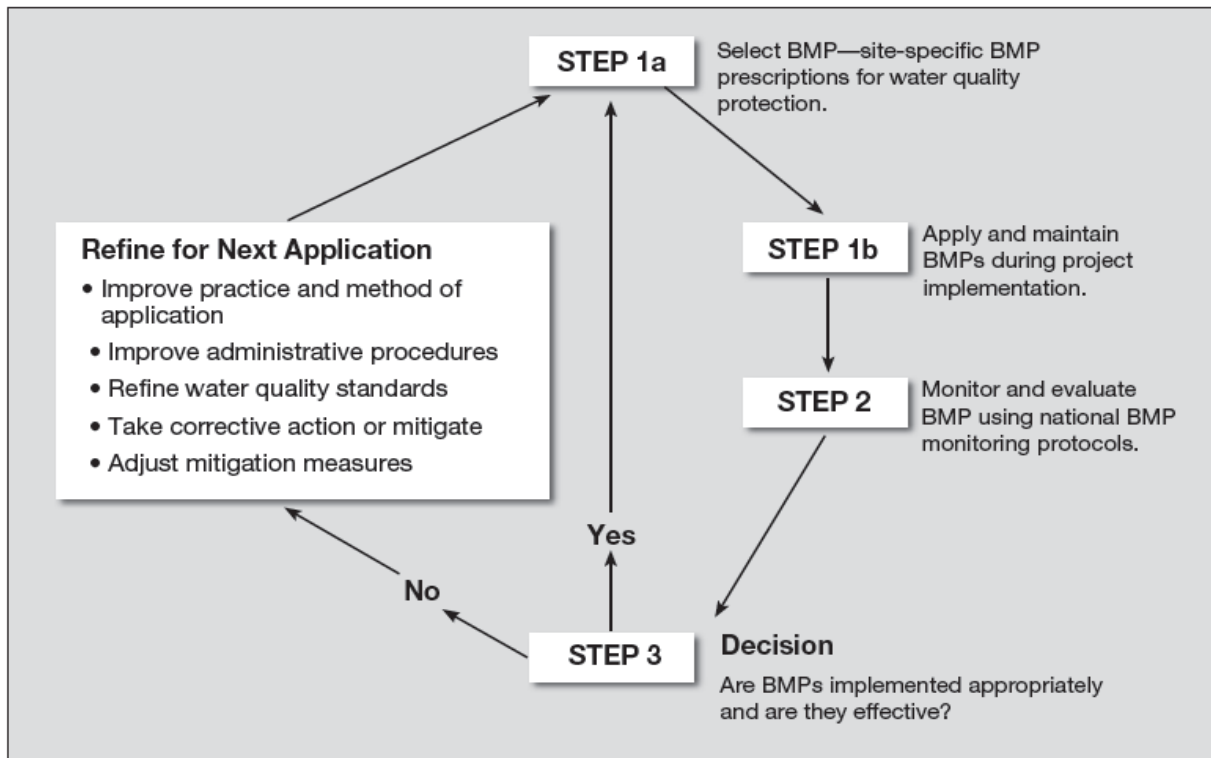


Figure 1. Adaptive process for BMP implementation.

In 2012, the FS initiated a National Program to develop a standard set of BMPs for national forests and grasslands to employ to protect water and aquatic resources during land-use activities throughout the Nation, and to provide a consistent means to track and document their use and effectiveness. These BMPs are described in the following document titled, *National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide* (USFS 2012). The National BMPs are deliberately general and it is expected that through project-level planning, interdisciplinary teams will develop site-specific prescriptions for each applicable Core BMP to fit the particular landscape, site, activity, beneficial water use, water quality standards, and local regulations. More details regarding this strategy are described in the National Core BMP Technical Guide, Vol. 1. (USFS 2012). A copy of the Guide is also available at the following FS website:

<http://www.fs.fed.us/biology/watershed/BMP.html>

### 3. Objectives

The objectives of this report are to:

1. Summarize results of FY 2013 BMP monitoring on the Mt. Hood National Forest;
2. Identify and summarize successes and challenges with BMP implementation and effectiveness on the MHNH;
3. Identify how implementation and effectiveness of BMPs at the project level might be improved; and,
4. Report on the findings of monitoring as required by the Forest Plan (see Chapter 5, pages 5-11 and 5-12).

### 4. Methods

Monitoring of National Core BMPs is conducted according to protocols, or methods which define how implementation or effectiveness is evaluated. Monitoring protocols are structured so that the data and information that is collected are comparable, repeatable, readily obtainable, and factual. Monitoring is a two-phase process, involving office and field review to assess the degree to which BMPs were implemented as planned, and the relative effectiveness of the specific BMPs to protect water and aquatic resources. Effectiveness protocols are qualitative methods whereby the levels of protection and risk are assessed through direct site observations. Typically there are multiple BMPs to evaluate within each monitoring protocol. The amount depends upon whether or not a BMP was prescribed during the planning phase and identified in the environmental documentation.

For 2013 the target set nationally by the Washington Office for the total number of protocols to monitor was set at three per Forest. The MHNH selected to exceed the minimum requirement and monitor ten in 2013 (Table 1). The MHNH monitoring consisted of activity locations that included four timber harvest units, three road sites, two recreation sites, and a weed eradication site. The sites were located in five different watersheds (10<sup>th</sup>-field hydrologic unit) on the Forest (Figure 2). Eight of the activity sites were selected randomly as per the sampling protocol. For two of the protocol categories however, there was

only one project in the sample pool at the District level, so random selection was infeasible. This amounted to a total of thirty-eight BMPs monitored in eight resource categories on ten different activity sites.

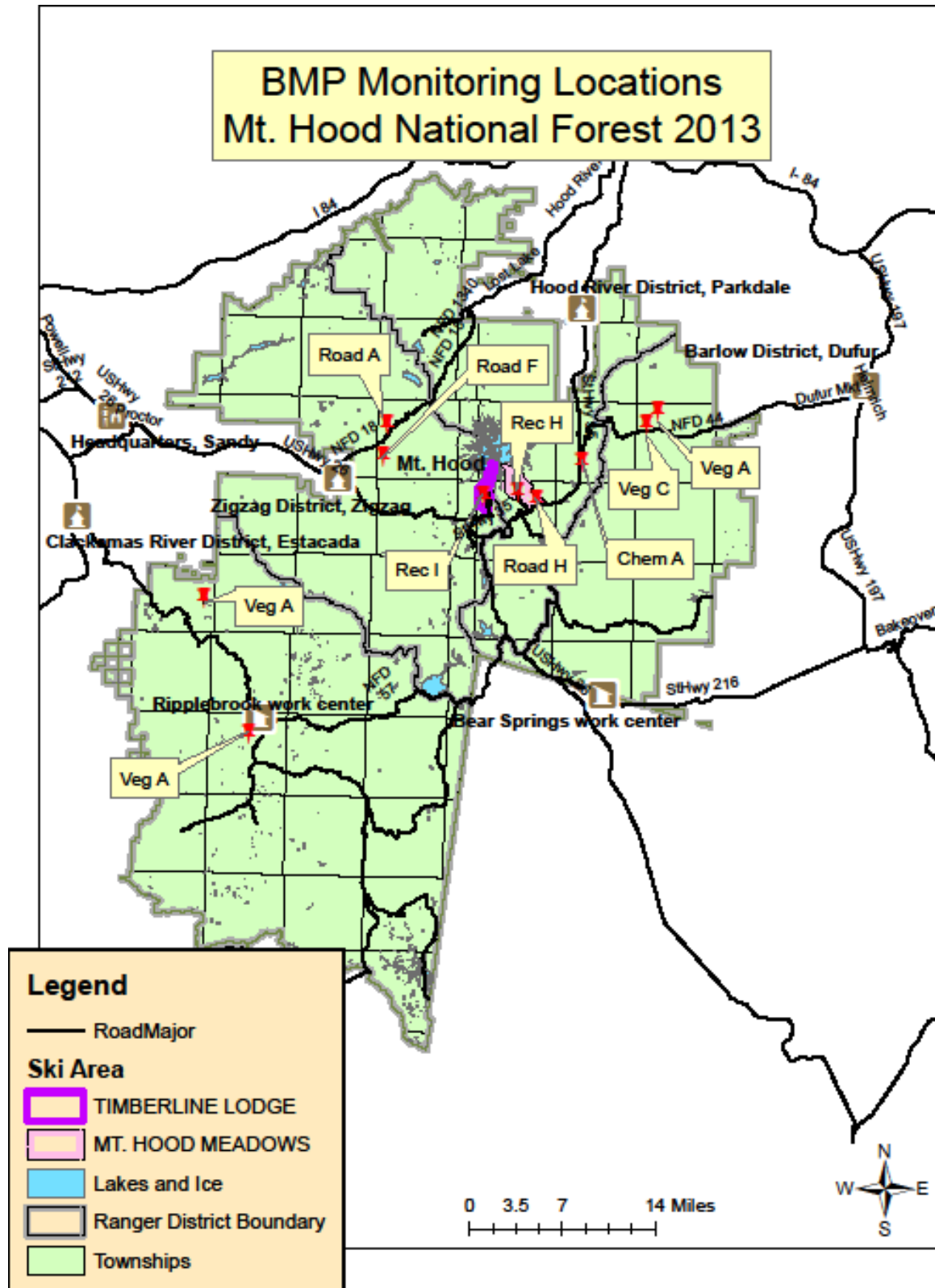
Table 1. Projects monitored on the MHNH in FY 2013, by watershed and subwatershed.

Watershed And Hydrologic Unit Code	Subwatershed and subunit code	Ranger District	Monitoring Protocol	National Core BMPs Evaluated*	Project Completion Date	Project Site/Name
Eight Mile Ck. (1707010502)	Upper Eight Mile Ck. (01)	Barlow	<b>Vegetation-A (Veg A)</b> Ground-based Skidding and Harvesting	Veg-1, 2, 3, 4, and 6, Road-5	6/2012	Shamrock Stewardship unit #2
		Barlow	<b>Vegetation-C (Veg C)</b> Mechanical Site Treatments	Veg-2, 3, 8	6/2012	Shamrock Stewardship unit #5
Middle Clackamas River (1709001104)	North Fork Clackamas (05)	Clackamas	<b>Vegetation-A</b> Ground-based Skidding and Harvesting	Veg-1, 2, 3, 4, and 6, Road-5	10/2012	Dry Thin Stewardship unit #21
	Three Lynx-Clackamas (01)	Clackamas	<b>Vegetation-A</b> Ground-based Skidding and Harvesting	Veg-1, 2, 3, 4, and 6, Road-5	2013	Reel Thin Stewardship unit #176
East Fk. Hood River (1707010505)	Upper East Fk. Hood River (01)	Hood River	<b>Chemical-A (Chem A)</b> Chemical Use Near Water Bodies	Chem-1, 3, 6	9/2013	Little John Snow Park
	Upper East Fk. Hood River (01)	Hood River	<b>Recreation-H (Rec H)</b> Ski Area Construction	Rec-10, Road-7, Veg-1, 2	Fall 2011	Stadium Chair Lift
	Upper East Fk. Hood River (01)	Hood River	<b>Road-H</b> Parking and Staging Areas	Road-9, Veg-2	1995	Hood River Meadows parking lot extension
Salmon River (1708000103)	Upper Salmon River (02)	Zigzag	<b>Recreation-I (Rec I)</b> Ski Run Operation and Maintenance	Rec-10, Veg-2	1955	Pucci Chair Lift Line
Upper Sandy River (1708000101)	Headwaters Sandy River (01)	Zigzag	<b>Road-A</b> Active Road Water Body Crossing Reconstruction	AqEco-2, Fac-2, Road-3, 7	9/2013	Road 18 Storm Damage Repair
	Headwaters Sandy River (01)	Zigzag	<b>Road-F</b> Completed Road Decommissioning	Fac-2, Road-6	9/2012	Road 1825-380 Decommission

\*Descriptions of the listed Core BMPs are in Appendix A or in the Technical Guide (USFS 2012) located at the following website: <http://www.fs.fed.us/biology/watershed/BMP.html>.



Figure 2.



Prior to conducting inspections in the field, District staff reviewed the project files of the selected operations and activities to determine which BMPs were prescribed during the planning phase and incorporated into environmental documentation for public disclosure. They then determined if those same BMPs were included as specifications into project work plans, contract specifications, or special use authorizations and then subsequently addressed in inspection notes, progress reports, or compliance checks completed during the implementation phase. Lastly, the reviewers conducted field reconnaissance at each site to verify if the BMPs had been employed as intended, and if so, evaluated further their effectiveness at minimizing or preventing impacts to water and aquatic resources.

During the reviews, answers to a series of standardized protocol questions relating to both implementation and effectiveness were determined from the site observations. Answers to the questions served as the basis for rating how successful implementation of BMPs was and the overall degree of their effectiveness. The responses were then recorded in an agency-wide database where the information will be stored and tracked for evaluation and reporting purposes at the Regional and National levels.

## 5. Results and Discussion

Following are the results of the BMP monitoring conducted in 2013 on the MHNF. Implementation of BMPs and the effectiveness of their application are rated qualitatively. Implementation ratings evaluate how well a particular BMP was employed. Effectiveness ratings assess how well an individual BMP performed at minimizing effects to aquatic and water resources near the site. These ratings at present are still under development by the National Program, and considered to be provisional until finalized. As the initial rollout of the BMP program progresses, it is recognized that based upon feedback from the field, the rating schema may need some adjusting. The ratings are intended to be for project-level monitoring efforts, defined by local discretion, and to tier to an individual unit's Forest Plan monitoring requirements [see Forest Plan Chapter 5 and Appendix H of the Forest Plan Final Environmental Impact Statement (FEIS)].

There are three implementation ratings:

- Implemented fully as prescribed – all elements of the BMP were applied as planned
- Partially implemented - some elements of the BMP were not applied as planned, or were applied differently than intended
- Prescribed but not implemented - no elements of the BMP were fully applied as planned, or the BMP was not needed as intended

There also are three effectiveness ratings:

- Fully effective - either no effects to aquatic or water resources, or effects are within the expected (and disclosed) range of magnitude
- Marginally effective - unintended effects observed on-site, there are either no effects to aquatic and water resources or the effects are within the expected range of magnitude



- Not effective - unanticipated effects to aquatic and water resources, effects are outside of the expected range of magnitude

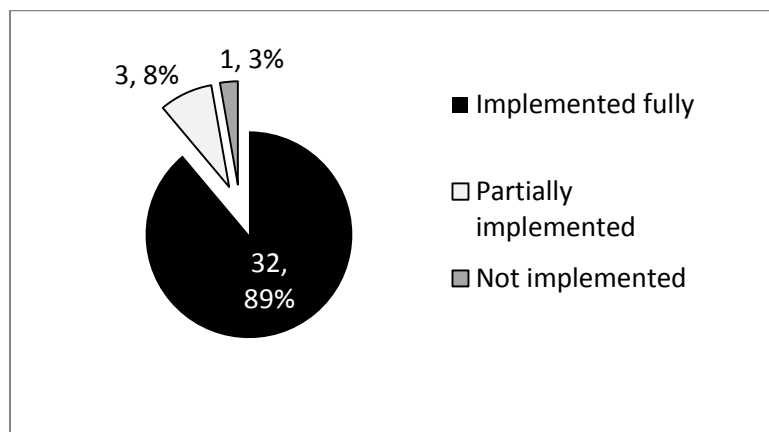
Ratings for BMP implementation and effectiveness are useful for identifying potential problems needing remedy or improvement, indicate causes for concern, or reveal difficulties and complications that signify adaptation opportunities.

### 5.1. Summary of Results

For the 10 activity sites evaluated, implementation and effectiveness monitoring of BMPs was conducted for all but one. For the Road H protocol (parking and staging areas), only effectiveness monitoring was performed because the project was completed nearly twenty years ago. A total of 38 Core BMPs in 8 resource categories were monitored across the 10 activity sites (see Table 1, and Figure 2). Implementation and effectiveness were monitored for 36 of the BMPs, and effectiveness was monitored for all of those plus 2 others.

Of the 36 Core BMPs monitored for **implementation**, 89 percent were implemented fully as prescribed. Three BMPs were partially implemented, and there was one that was not (Figure 3). At every activity site there were BMPs that were fully implemented as intended, but at 4 of them there was a degree of deviation from full implementation.

Figure 3. BMP implementation monitoring results for all MHNH projects monitored in 2013.



- On the **Barlow Ranger District (RD)**, 9 BMPs intended to minimize the effects of mechanized ground-based thinning and post-harvest slash abatement were monitored, and all were found to have been implemented fully as prescribed.
- On the **Clackamas RD**, 12 BMPs intended to minimize the effects of mechanized ground-based thinning from two different timber sales were monitored, and all but one were implemented fully as prescribed. On the one site however, the Core BMP for Temporary Roads was not implemented as prescribed, and it had not been rehabilitated as intended.

Rehabilitation of temporary roads after harvest had been prescribed in the environmental document, and was included as a specification in the stewardship contract. But in one of the units monitored the rehabilitation had not occurred. The reason was determined ultimately to be the lack of final inspection of the harvest unit prior to the operator moving their equipment

to the next one. When the timber sale administrator went to check on operations and found that the operators had moved, it was assumed in this instance that the rehabilitation had been performed because it had been completed as required in other units previously logged in the sale by that operator.

- On the **Hood River RD**, 7 BMPs intended to minimize the effects of chemical treatment to eradicate noxious weeds and the construction of a replacement ski lift were monitored. All of them were found to have been implemented fully as prescribed.
- On the **Zigzag RD**, 8 BMPs intended to minimize the effects of the continued use of a ski run, the reconstruction of a road crossing over a stream, and the decommissioning of a road were monitored. Five of the BMPs monitored at those 3 sites were implemented fully as prescribed, but 3 BMPs were found to have been partially implemented.

First, the BMP for ski run operation and maintenance was included as a standard component of the operation plan of a ski resort. At one site on the ski run that was monitored, maintenance of effective ground cover and an energy dissipater at a culvert outlet had not occurred during the summer. It is believed that because of all the construction and restoration projects that were occurring at that resort that particular summer that maintenance was inadvertently overlooked at that site. Also, at the time the MHNH ski-area administrator position was vacant due to a retirement. The position had not been filled so administration of the special use permit and maintenance at that site had not been identified that summer.

Second, at a site where a road crossing over a stream was reconstructed and repaired as a result of storm damage, several erosion control procedures had not been fully achieved. The BMP for preventing erosion that could result at the construction site from storm runoff was prescribed in the environmental documentation and included as a specification of the contract. Fill material that had been temporarily excavated was stockpiled in the inboard ditch of the road, where had a storm occurred it could have become a source of sediment to the stream. The material was placed there by the contractor because of safety concerns and a tight work area on steep slopes where minimizing the movement of heavy equipment was desirable. The ditch was a close and easy location for stockpiling. The material had been placed there by the contractor before the Contracting Officer's Representative (COR) had arrived for inspection, so rather than move the material again the COR approved its location anticipating good weather conditions. It had also been noted that erosion control materials had not yet been staged on site for contingency, and for covering bare ground at the end of the day in case a storm occurred over night. The situation was eventually corrected and erosion materials were brought to the site before the project was completed.

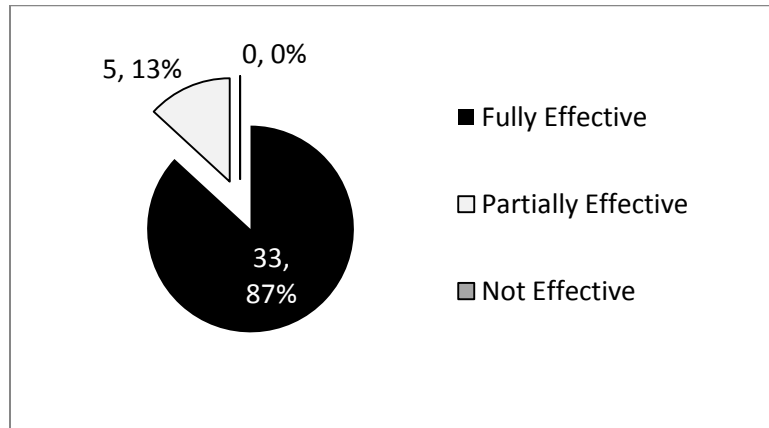
Third, at a site where a road was decommissioned, the BMP for effective ground cover was not fully achieved. Environmental documentation included a specific BMP for effective ground cover, and it was stipulated in the contract too. The contractor had run out of mulch at that particular location but proceeded to work, choosing to substitute slash and coarse woody debris in the absence of mulch. By the time the COR arrived to inspect the work, the contractor had proceeded well beyond that site, continuing to use slash and coarse woody material in lieu of mulch. The COR decided to accept the work rather than request the contractor to take mulch back because the extent of bare ground was considered to be minimal.

Of the 38 Core BMPs monitored for **effectiveness**, 87 percent were fully effective at preventing or minimizing the effects of activities to aquatic and water resources as prescribed. There were 4 BMPs

that were implemented only partially as prescribed. The magnitude of effect to aquatic and water resources however was considered to be minimal, so they were determined to be partially effective (Figure 4). Some unintended effects (i.e., small erosion features) were observed on-site, but evidence that prolonged and extensive transport of sediment to aquatic and water resources had occurred was not observed, so the effects are not considered to be substantially accelerated beyond the expected range of magnitude.

- On the **Barlow Ranger District (RD)**, 9 BMPs intended to minimize the effects of mechanized ground-based thinning and post-harvest slash abatement were monitored, and all were found to have been fully effective.
- On the **Clackamas RD**, 12 BMPs intended to minimize the effects of mechanized ground-based thinning from two different timber sales were monitored, and all but one was fully effective. The Core BMP for rehabilitating Temporary Roads that had not been implemented resulted in some observable surface erosion, but transport of sediment off-site to a water body had not occurred and because of its location there was no potential for it to do so.

Figure 4. BMP effectiveness monitoring results for all MHNH projects monitored in 2013.



- On the **Hood River RD**, 9 BMPs intended to minimize the effects of chemical treatment to eradicate noxious weeds, the construction of a replacement ski lift, and the continued use of a parking lot extension were monitored. Eight of those were found to be fully effective, however one was found to be only partially effective.

In the parking lot extension site the vegetated ground cover on a cut slope was observed as being partially barren. Evidence of small erosional features was noted, and there were signs that a proportion of sediment had migrated diffusely part way across the parking lot. Storm water lead-out ditches at the lot's drainage outlets were effectively trapping sediment and preventing it from being transported to a water body. So even though vegetated ground cover over a small area (<0.05 ac) of cut bank was less than optimal, there was no observable effect traceable to a surface water body.

- On the **Zigzag RD**, Five of the 8 BMPs that were intended to minimize the effects of the continued use of a ski run, the reconstruction of a road crossing over a stream, and the decommissioning of a road were considered to be fully effective. A single BMP at each of those sites however was considered to be partially effective because certain items specific to its implementation were only partly employed. The unintended erosional features observed

on-site however were deemed to be minor and short-lived with no long-term effects to water quality.

On the long-used ski run, energy dissipation at the outlet of a culvert had ceased to function optimally, causing concentrated flow to generate a moderate degree of gullying that had eventually migrated downhill, establishing a connection to an ephemeral draw where during a brief period there is stream flow generated by snowmelt in late spring and early summer. Specific maintenance items of the BMP related to drainage structures and ground cover were not fully effective at one site on the ski run.

At the location where a road crossing over a stream had been reconstructed, a temporary access road was needed to remove the old culvert. The initial alignment of the temporary road as intended had to be modified to accommodate safety concerns relative to heavy equipment working on a steep mountainside. As an unintended consequence, fill material that was generated by construction of the temporary access road was placed in a ditch line that lead directly to the stream because it was close and out of the way of the machinery. The material was re-emplaced as intended for the finish grade and re-contoured. If a rain event of sufficient magnitude had occurred, the fill material could have been subject to erosion and sediment delivered directly to the stream. But such an event did not occur so there was no threat to water quality. The contractor also did not stage erosion control materials to the site prior to work so that exposed dirt could be covered daily at the end of shift to protect it overnight from a heavy rain event should it occur. As mentioned, such an event did not occur, so sediment at the site did not mobilize and compromise water quality.

At an excavated crossing on a decommissioned road, an approximately 100 square foot patch of ground near the new channel had been left untreated with the contractually specified amount of ground cover. Rather, slash and coarse woody debris had been deposited on the site, but to the degree that only a portion of it was protected so more bare ground was exposed than intended. Some small erosional pedestal features had developed, but debris between them and the stream had prevented sediment transport to the water. The extent of unprotected bare ground is small, and inputs of detritus from the surrounding forest canopy, along with new growth is expected to develop and provide effective ground cover within a short time frame so the condition is expected to remedy naturally.

## 6. Recommendations

The majority of BMPs that were monitored in 2013 were implemented as prescribed and effective at minimizing effects of activities to aquatic and water resources. Monitoring results also indicate that while some BMPs were not implemented fully as prescribed, the effect to water quality was minimal. Reasons for the effects being minimal even though a particular BMP was only partially implemented are due principally to: 1) a relatively small area of impact, 2) the duration of the condition was not prolonged, and/or 3) the location of the condition was removed and disconnected from a surface water body.

But the monitoring results also indicate that there is an opportunity for continual improvement.

- Planners and implementation staff should collectively conduct a review prior to advertisement to insure that the BMPs prescribed are represented as intended by specifications that are

enforceable in the contract or task order. Such a review could also help everyone to be on the same page so that expectations and outcomes are consistent amongst planners and implementation staff.

- For Indefinite Quantity, Indefinite Quality (IDIQ) contracts with multi-year terms, reviews may be needed periodically to help identify any new direction that may not be represented in the contract relative to upcoming work.
- District staff sometimes provide support to contract and permit administrators by conducting inspections, but they have no contractual authority. Thus it is important that when such support is arranged, both have a clear understanding and agreement on the expected procedures, methods, and outcomes.
- Inspection of contractor's work cannot always occur while the work is being conducted, it often occurs afterward. The timing of inspections by CORs and their supporting District staff is important for insuring intended outcomes are achieved. Identify early the important junctures, procedures, or methods when inspection prior to continuance may be critical and notify all parties.
- Prior to pre-work meetings with operators or contractors, implementation staff and planners should mutually highlight and document the important aspects of the project, expectations, the degree of flexibility, and the anticipated outcomes, acknowledging that the concurrence of outcomes between them may not be 100 percent.
- During the planning phase, implementation staff and planners should gather to insure that BMPs and site specific project design criteria that are prescribed can be translated into a contractual clause or permit requirement.
- Review ski-area Master Development Plans to identify updates that may make their operational and maintenance plans more in line with the new National Core BMP program.
- Update Appendix H of the FEIS for the Mt. Hood Forest Plan to reflect and represent the new National BMP program, and provide renewed monitoring direction prior to Forest Plan Revisions, if possible.

### 6.1. Specific Remedies

Relative to the activity sites monitored in 2013, there are some follow-up items that are recommended to occur.

- For Unit #21 of the Dry Thin stewardship contract, obliterate the temporary road as planned under a different contract using retained receipt funds. For future projects, re-emphasize to all the contractual parties the temporary road rehabilitation requirements.
- For the parking lot extension near the Nordic lodge at Hood River Meadows, enhance ground cover on the back cut slope so as to deter further accelerated erosion at the site. Address the possibility with the permittee of installing several additional, or enhancing existing drainage features that disperse runoff more efficiently.
- For the Pucci lift line, address the need with the permittee of dissipating energy of concentrated flow at the outlet end of the culvert, improving effective ground cover on the small barren patches of the slope, and eliminating the small gully and its connection to the headwater ephemeral draw.

- On road decommissioning or re construction projects, inform contractors ahead of time of logistical complications and expected outcomes, making sure to review contractual specifications for erosion control and storm damage prevention. Staging erosion control materials ahead of time can prevent re-work or the lack of fully implemented BMPs, and help to achieve the mutually agreed upon outcomes of both planners and implementation staff.

## 7. References

In order of Appearance:

USDA Forest Service. 1990. Land and Resource Management Plan, Mt. Hood National Forest. Pacific Northwest Region.

US Environmental Protection Agency. 1987. Water quality standards handbook, Nonpoint source controls and water quality standards.

USDA Forest Service and USDI Bureau of Land Management. 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl. Standards and Guidelines for Management of Habitat for Late-Successional and Old Growth Forests Related Species Within the Range of the Northern Spotted Owl. (i.e., Northwest Forest Plan)

Oregon Department of Environmental Quality (OR-DEQ) and USDA Forest Service (FS), Pacific Northwest Region. 2013. Clean Water Act Memorandum of Understanding.

National Core BMP Technical Guide, Vol. 1. FS-990a, 2012. Located at:

<http://fsweb.wo.fs.fed.us/wfw/watershed/national-bmps.html>

[http://www.fs.fed.us/biology/resources/pubs/watershed/FS\\_National\\_Core\\_BMPs\\_April2012.pdf](http://www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012.pdf)

USDA Forest Service (FS), Pacific Northwest Region and Washington State Department of Ecology. 2000. Memorandum of Agreement for meeting responsibilities under federal and state water quality laws.

USDA Forest Service. 2012. National Best Management Practices for Water Quality Management on National Forest System Lands.

## 8. Appendix A: List of Core BMPs Monitored on the Mt. Hood NF in 2013

Monitoring Protocol and Core BMP	Project Site/Name
<b>Vegetation-A (Veg A)</b> Ground-based Skidding and Harvesting	Shamrock Stewardship unit #2
Veg-1. Vegetation Management Planning	
Veg-2. Erosion Prevention and Control	
Veg-3. Aquatic Management Zone	
Veg-4. Ground-based Skidding and Yarding	
Veg-6. Landings	
Road-5. Temporary Roads	
<b>Vegetation-C (Veg C)</b> Mechanical Site Treatments	Shamrock Stewardship unit #5
Veg-2. Erosion Prevention and Control	
Veg-3. Aquatic Management Zone	
Veg-8. Mechanical Site Treatment	
<b>Vegetation-A</b> Ground-based Skidding and Harvesting	Dry Thin Stewardship unit #21
Veg-1. Vegetation Management Planning	
Veg-2. Erosion Prevention and Control	
Veg-3. Aquatic Management Zone	
Veg-4. Ground-based Skidding and Yarding	
Veg-6. Landings	
Road-5. Temporary Roads	
<b>Vegetation-A</b> Ground-based Skidding and Harvesting	Reel Thin Stewardship unit #176
Veg-1. Vegetation Management Planning	
Veg-2. Erosion Prevention and Control	
Veg-3. Aquatic Management Zone	
Veg-4. Ground-based Skidding and Yarding	
Veg-6. Landings	
Road-5. Temporary Roads	
<b>Chemical-A (Chem A)</b> Chemical Use Near Water Bodies	Little John Snow Park
Chem-1. Chemical Use Planning	
Chem-2. Follow Label Instructions	
Chem-6. Chemical Application Monitoring and Evaluation	



<b>Recreation-H (Rec H)</b> Ski Area Construction	Stadium Chair Lift
Rec-10. Ski Runs and Lifts	
Road-7. Stream Crossings	
Veg-1. Vegetation Planning	
Veg-2. Erosion Prevention and Control	
<b>Road-H</b> Parking and Staging Areas	Hood River Meadows parking lot extension
Road-9. Parking and Staging Areas	
Veg-2. Erosion Prevention and Control	
<b>Recreation-I (Rec I)</b> Ski Run Operation and Maintenance	Pucci Chair Lift Line
Rec-10. Ski Runs and Lifts	
Veg-2. Erosion Prevention and Control	
<b>Road-A</b> Active Road Water Body Crossing Reconstruction	Road 18 Storm Damage Repair
AqEco-2. Operations in Aquatic Ecosystems	
Fac-2. Facility Construction and Stormwater Control	
Road-3. Road Construction and Reconstruction	
Road-7. Stream Crossings	
<b>Road-F</b> Completed Road Decommissioning	Road 1825-380 Decommission
Fac-2. Facility Construction and Stormwater Control	
Road-6. Road Storage and Decommissioning	